

# HELMINTHOLOGICAL ABSTRACTS

*incorporating*

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COMPILED FROM WORLD LITERATURE OF 1952



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# HELMINTHOLOGICAL ABSTRACTS

Vol. 21, Part 1

1952

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# HELMINTHOLOGICAL ABSTRACTS

INCORPORATING BIBLIOGRAPHY OF HELMINTHOLOGY

FOR THE YEAR 1952

Vol. 21, Part 1

## American Journal of Hygiene.

- a. OLIVIER, L., 1952.—“A comparison of infections in mice with three species of schistosomes, *Schistosoma mansoni*, *Schistosoma japonicum* and *Schistosomatum douthitti*.” 55 (1), 22–35.

(1a) Olivier reports on his investigations which were primarily planned to compare production of the pulmonary lesions provoked by *Schistosoma mansoni*, *S. japonicum* and *Schistosomatum douthitti* in mice. The methods employed for exposing the mice to infection, counting the pulmonary haemorrhages and for recovering the worms from the lungs and in the portal system, are described in detail. All three species produced haemorrhages in the lungs on their migration through these organs to reach the portal system. *Schistosomatum douthitti* and *Schistosoma japonicum* produced many conspicuous haemorrhages which appeared rapidly while *S. mansoni* provoked fewer haemorrhages which were evident for a long time. The author concludes that the two first species produce pulmonary haemorrhages in the mouse during migration but that *S. mansoni* does not always do so. *S. mansoni* passes through the lungs less rapidly than do the other two. The number of worms recovered at the autopsy suggests that *Schistosomatum douthitti* and *Schistosoma japonicum* were more successful in establishing themselves in mice than was *S. mansoni*. Olivier suspects that the accumulation of *S. mansoni* in the lungs and their slow passage to the portal system may be due to the response of an abnormal host.

P.L.Ier.

## American Journal of Tropical Medicine and Hygiene.

- a. STONE, W. S., 1952.—“Tropical medicine in the Armed Forces.” 1 (1), 27–29.  
b. FAUST, E. C., AGOSIN, M., GARCIA-LAVERDE, A., SAYAD, W. Y., JOHNSON, V. M. & MURRAY, N. A., 1952.—“Unusual findings of filarial infections in man.” 1 (2), 239–249.  
c. GIBSON, C. L., 1952.—“Comparative morphology of the skin-inhabiting microfilariae of man, cattle, and equines in Guatemala.” 1 (2), 250–261.  
d. MELENEY, H. E., MOORE, D. V., MOST, H. & CARNEY, B. H., 1952.—“The histopathology of experimental schistosomiasis. I. The hepatic lesions in mice infected with *S. mansoni*, *S. japonicum* and *S. haematobium*.” 1 (2), 263–285.  
e. HSU, H. F., LI, S. Y., WANG, C. K., FAN, P. C. & HUANG, T. C., 1952.—“Studies on schistosomiasis japonica in Formosa.” 1 (2), 287–301.  
f. WEINSTEIN, P. P. & APPELGET, J. G., 1952.—“Some observations on *Diphyllobothrium latum* from Shagwa Lake, Minnesota.” 1 (2), 302–306.  
g. MAGATH, T. B. & THOMPSON, Jr., J. H., 1952.—“Diethylcarbamazine (hetrazan) in experimental trichinosis.” 1 (2), 307–313.

(2a) The tropical diseases experienced in the U.S. army in World War II, during 1942 to 1945 inclusive, are tabulated under selected categories. The total number of cases of filariasis was 4,036—an average of 1,009 per year and of schistosomiasis cases the total was 36 with an average of 409 per year.

R.T.L.

(2b) In thick blood films from a patient with recurrent oedematous erysipelas of legs, hands and forearms there were immature worms considerably larger than microfilariae. They



are believed to be post-microfilarial stages of *Wuchereria bancrofti*. The youngest had a diameter of  $11\mu$ , contained a number of cells in a densely stained columnar matrix and enclosed in a distinct cuticle. A more advanced stage measured about  $21\mu$  in diameter, had transverse cuticular striations. None had a sheath. The other worms were developed and mature rhabditoid larvae. The most advanced was 0.66 mm. in length and  $26\mu$  in diameter. It had a complete digestive tract; the oesophagus had a well developed anterior portion joining a non-muscular posterior portion. There was a distinct nerve ring. As the worm was obtained under strictly aseptic conditions and as the larvae closely resembled the stages of *Wuchereria* in the mosquito, it is concluded that these worms were genuine haemophagous. At an autopsy on a Colombian negro, a thread-like worm protruded from a dilated femoral artery. It was a mature female, probably of *W. bancrofti*. In an ovoid encapsulated mass which was removed from the upper eyelid of a resident in West Palm Beach, Florida, there was an immature female worm. Portions of a second worm were removed from a superficial nodule on the arm of a white woman at Jacksonville, Florida. Both these worms are diagnosed as *Dirofilaria conjunctivae*. It is suggested that *D. conjunctivae* may possibly be *D. immitis* in an appropriate host.

(2c) As *Simulium metallicum*, *S. ochraceum* and *S. callidum*, vectors of *Onchocerca* in Guatemala, are avid feeders on horses, cattle and man which may have microfilariae in the skin, Gibson has made a comparative study of the morphology of the microfilariae in these hosts. He has shown that *O. volvulus* in man, *O. gutturosa* in cattle and *O. reticulata* in horses can be distinguished by the form, size and arrangement of the caudal nuclei.

(2d) Three weeks after experimental infection of white mice with unisexual *Schistosoma mansoni*, the liver usually showed periportal infiltration with mononuclear and polymorphonuclear leucocytes which increased in intensity up to about 12 weeks. Cellular infiltration of the parenchyma, predominantly polymorphonuclear, occurred in some independent extensions from the periportal infiltrations. Areas of coagulative necrosis became invaded by polymorphonuclear leucocytes with subsequent disappearance of liver cells and invasion by mononuclear and multinuclear cells. There was no evidence of cirrhosis of the liver in unisexual infections up to 95 weeks. The lesions in unisexual infections with *S. haematobium* and *S. japonicum* were similar, but less intense. In bisexual *S. mansoni* infections of up to five weeks duration the periportal and parenchymal cellular infiltration and necrosis appeared earlier and were more intense than in unisexual infections. The intense cellular infiltrations and areas of necrosis were probably due to the presence of worms in the mesenteric portal vein.

(2e) From a historical review of Japanese literature on the epidemiology of *Schistosoma japonicum* in Formosa, it is apparent that the chief endemic areas are Changhua Hsien, in Taichu Prefecture in the mid-western part of Formosa, and Laonung, in Kaohsiung Prefecture in the Takao Prefecture in the south-west. The current idea that Schinchiku in the north is the main endemic centre in Formosa is without foundation. A description is given of the habits, distribution and incidence of infection of the vector *Oncomelania formosana* in an irrigated rice-growing area in Changhua Hsien. Of the 628 villages searched, the molluscs were present in 140, the names of which are listed and mapped. *O. formosana* usually occurs in the narrowest irrigation ditches, about 0.5 m. in width, with turbid water of high salt content and characteristically associated with the shade of bamboo groves. The average incidence of cercarial infection was 1.3%.

(2f) In dogs experimentally infected with plerocercoids of *Diphyllbothrium latum*, eggs first appeared in the faeces after 14-20 days. When plerocercoids, obtained from infestations



*Stizostedion vitreum* which had been stored at temperatures ranging from  $-2^{\circ}\text{C}.$  to  $5^{\circ}\text{C}.$  for at least 42 days after being caught were fed to a dog, eggs appeared in the faeces after 18 days. The authors failed to infect guinea-pigs, rabbits, rats and a rhesus monkey. R.T.L.

(2g) Hetrazan, even in large and excessive doses, did not influence the course of experimental trichinosis in the rat, or affect the adults, migrating larvae or the encysted *Trichinella*. R.T.L.

### 3—Australian Journal of Agricultural Research.

- a. GILES, J. E. & BROCK, R. D., 1952.—“Rate of increase of nematode infestation of tomatoes after soil fumigation.” 3 (1), 16–23.

(3a) Giles & Brock report further observations on the experimental plots of tomatoes infested with *Heterodera marioni* and injected with D-D mixture in 1948 [see Helm. Abs., 18, No. 664a]. In the two seasons following the original experiment the seed-beds were fumigated throughout, but three of the four plots were given no more fumigation. These show deteriorating yields, an increasing eelworm population as measured by root ratings, and a loss in plant vigour earlier in the season as measured by health ratings. Mean yields for the 6 grades used in root rating (0 to 5) show that up to grade 2 there may be no loss of yield, but the percentage yield reductions for grades 3, 4 and 5 are about 22%, 47% and 80%, respectively. Results show that a single D-D treatment may afford protection for three seasons if no eelworms are reintroduced from outside. B.G.P.

### 4—Beiträge zur Pathologischen Anatomie und zur Allgemeinen Pathologie.

- a. ALTMANN, H. W. & GÖNNERT, R., 1952.—“Über funktionell bedingte Hypertrophien und Hyperplasien. Untersuchungen am intrahepatischen Gallengangssystem der weissen Maus bei experimenteller Bilharziose.” 112 (1), 8–35.

(4a) Altmann & Gönnert discuss in detail the changes which take place in the intrahepatic bile ducts of white mice infected with *Schistosoma mansoni* and also during the healing processes following treatment with miracil D. The changes consist of reversible hypertrophy of individual cells and mitotic hyperplasia. Increased function of the enlarged duct epithelia, caused by the body substances of the parasites which are released when ova or worms are destroyed in the liver, bring about enhanced secretory activity. The structural changes, at first progressive and later regressive, are signs of adaptation to the increasing (later decreasing) demands made on individual cells and on the duct system as a whole. A.E.F.

### 5—British Farmer.

- a. GOODALL, W. S., 1952.—“Eel worm in potato land.” [Correspondence.] No. 44, p. 4.

(5a) When farming in the Peterborough district, Goodall found that the best way to deal with eelworm and wireworm was to plough the land well following harvest or potatoes, then harrow it down and draw out ridges as for planting potatoes. When the first sharp frost came, the ridges were cross cultivated and this was repeated twice during the winter. Before sowing a spring crop, 10–15 cwt. of naphthalene per acre were immediately cultivated in or ploughed in to a depth of 5–6 inches. This treatment was carried out for two successive years. Goodall claims that this procedure will do away with the necessity of resting the land for seven years after successive crops of potatoes and that it would be safe to plant potatoes again in four to five years. R.T.L.

### 6—British Medical Journal.

- a. MILLER, W. S., 1952.—“A persistent urinary *Salmonella dublin* carrier with bilharziasis.” Year 1952, 1 (4759), 628–629.



### 7—Bulletin de la Société de Pathologie Exotique.

- a. CASILE, M. & SACCHARIN, H., 1952.—“Sur un cas de lésions génitales lymphatico-veineuses dans la filariose de Bancroft.” 45 (1), 56–60.
- b. PFISTER, R., 1952.—“Répartition et fréquence des filarioses en Haute-Volta et en particulier dans la région de Bobo-Dioulasso.” 45 (1), 92–102.

(7b) In the Bobo-Dioulasso region of the Upper Volta in French West Africa, Pfister found microfilariae of *Acanthocheilonema perstans* in 85% of the older population, in 67% of the younger men, 58% of the women, 25% of the boys under 15 and 20% of the girls under 15, unaccompanied by any clinical symptoms. The vector is unknown. Of 74 microfilariae which were measured, only 30 corresponded with the “long” and “short” types defined by Brumpt. Onchocerciasis in the Bobo-Dioulasso region was most prevalent near swiftly flowing rivers suitable for the breeding of the *Simulium* vectors, where on an average about 20% of the population were infected; only half those infected had nodules. In the whole Upper Volta area an average of only 3% of 31,176 persons examined had nodules. Forty-four out of 1,440 examined (two-thirds of whom were Ivory Coast plantation workers) had diurnal microfilariae of *Wuchereria bancrofti* but no clinical symptoms. The true incidence is probably considerably higher and varies widely from one village to another. The incidence of *A. perstans* was strikingly higher in areas with relatively high rainfall, i.e. towards the south of the Upper Volta area. No *Loa loa* infection was found.

P.M.B.

### 8—Bulletin of Zoological Nomenclature.

- a. HEMMING, F., 1952.—“Seven problems of zoological nomenclature involving the clarification, amendment or expansion of the ‘Règles Internationales’ which will be considered by the fourteenth International Congress of Zoology, Copenhagen, 1953: preliminary appeal to zoologists for advice.” 7 (1/2), 1–3.

(8a) The International Congress of Zoology at its next meeting in Copenhagen, in 1953, is to consider definite proposals from the International Commission on Zoological Nomenclature for the clarification, amendment or expansion of the international rules. In the present communication the Secretary makes concrete recommendations for the Congress’ consideration and appeals to zoologists to join in the search for solutions of the seven problems, viz., (i) the reform of Article 19 of the *Règles* relating to the conditions in which emendations of scientific names should be made or accepted; (ii) the substitution for the existing Articles 4 and 5 of the *Règles* of comprehensive provisions relating to the naming of Families (including Super-Families) and supra-generic categories of lower rank; (iii) the possible addition to the *Règles* of provisions governing the naming of Orders and higher taxonomic categories; (iv) the species to be accepted as the type species of a nominal genus, the name of which was first published in a generic synonymy; (v) the application of a trivial name which, when first published, is applied to a particular species or specimen but which is stated also to be a substitute name for some previously published name; (vi) the question of whether, and subject to what conditions, the concept of a “neotype” should be officially recognized in the *Règles*; (vii) the problem of securing stability in zoological nomenclature.

R.T.L.

### 9—California Agriculture.

- a. BAINES, R. C. & CLARKE, O. F., 1952.—“Citrus-root nematode. Effects on young lemon and orange trees studied in inoculation tests under controlled conditions.” 6 (2), 9, 13.

(9a) *Tylenchulus semi-penetrans* may affect the growth of young citrus trees in four ways: (i) by injury to root bark, (ii) by feeding, (iii) by upsetting normal function and growth and (iv) by the possible injection of toxins. In pot experiments conducted on five different types of citrus seedling, inoculation of the soil with eelworm larvae caused poor growth of seedlings varying between 10% and 50% of the controls. There was also a considerable effect on root growth. Calculations suggest that there are  $2-7 \times 10^6$  citrus nematode larvae per cubic foot in the top 2 ft. of soil after infested trees are removed. Fumigation with D-D mixture at 500–1,000 lb. per acre gave good control of the nematodes.

J.B.G.



**10—Canadian Journal of Comparative Medicine.**

- a. SWALES, W. E., 1952.—“Pasture studies on parasitic diseases of sheep in eastern Canada. I. The use of phenothiazine-salt mixtures during the grazing season.” 16 (2), 48–56.
- b. SWALES, W. E., 1952.—“Enterohepatitis (blackhead) in turkeys. VIII. Further observations on the uses and mode of action of 2-amino-5-nitrothiazole.” 16 (2), 57–62.
- c. SWALES, W. E., 1952.—“Enterohepatitis (blackhead) in turkeys. IX. Miscellaneous tests of chemicals for possible therapeutic or prophylactic value.” 16 (2), 63–65.
- d. FRANK, J. F., 1952.—“A study of the incidence of trichinosis in swine in the Maritime Provinces.” 16 (2), 73–77.
- e. MARSH, H., 1952.—“Disease problems in range livestock.” 16 (3), 89–96.

(10a) From controlled experiments made in Canada during three pasture seasons on a small experimental farm connected with the Section of Parasitology, Division of Animal Pathology of the Dominion Department of Agriculture, it is concluded that the provision of 5% phenothiazine-salt lick throughout the season as an adjunct to the individual treatment of adult sheep with 30 gm. of phenothiazine before putting out to pasture, increases the chances of eradicating *Oesophagostomum columbianum* from a flock. R.T.L.

(10b) The results of further experiments confirm that 2-amino-5-nitrothiazole is as effective in the control of outbreaks of enterohepatitis when the drinking water is medicated with a soluble form of the drug, and when affected poulters are treated individually at 48-hour intervals, as when the drug is incorporated in the food. Its anthelmintic action on the larvae of *Heterakis gallinae* is also confirmed. R.T.L.

(10c) Four new drug structures, viz., *p*-(6-nitro-2-benzothiazolylamino) benzoic acid, 2-amino-6-nitrobenzothiazole, *p*-(2-benzothiazolylamino) benzoic acid and 4-(4-nitrobenzylamino) benzoic acid were tested but showed no promise of therapeutic or prophylactic value in blackhead in turkeys. Sodium acetarsol did not give effective protection and did not affect the *Heterakis* larvae which had transmitted the disease to test poulters. R.T.L.

(10d) Four only of 1,002 swine from 826 farms in the three Maritime Provinces of Canada showed *Trichinella* larvae in the diaphragm on microscopical examination and by the digestion-Baermann technique. The number of larvae present in 50 gm. of tissue ranged from 4 to 4,116. Two of the positives came from one farm. Raw offal from hogs slaughtered on the premises was being fed to the remaining swine. An infected rat had previously been obtained from this farm and three rats obtained on the adjoining premises were all infected. The source of the infection on the second farm could not be traced; on the third farm it may have been a few fox carcasses which had been fed to the swine. R.T.L.

(10e) Marsh draws attention to the conditions under which livestock management in the range areas of the U.S.A. and Canada affects the occurrence, epidemiology, treatment and control of diseases. That intestinal parasites are less serious in the range country is attributed largely to climate, as the semi-arid conditions of much of this area are unfavourable to the development of the free-living stages of nematodes and the grazing areas have a low carrying stock capacity. The long periods of low temperatures in the northern regions inhibit the hatching of helminth eggs. In Montana *Bunostomum* is absent and *Oesophagostomum* spp. do not occur west of the 20-inch rainfall line. *Haemonchus contortus* is relatively unimportant in areas with low rainfall, and the low infections with *Trichostrongylus*, *Ostertagia* and *Nematodirus* do not result in clinical parasitism in sheep although it may develop in lambs brought from summer range to irrigated areas, meadows and pastures. Western sheep commonly harbour *Thysanotoma* or *Moniezia* but their pathogenicity is doubtful. R.T.L.

**11—Canadian Journal of Public Health.**

- a. FRANK, J. F., 1952.—“The incidence of trichinosis in swine in the Maritime Provinces.” [Abstract of paper presented at the 19th Annual Meeting of the Laboratory Section, Canadian Public Health Association, Toronto, December 17–18, 1951.] 43 (1), 34.

(11a) [A fuller account of this paper appears in *Canad. J. comp. Med.*, 1952, 16, 73–77. For abstract see No. 10d above.]



## 12—Comptes Rendus des Séances de l'Académie des Sciences. Paris.

- a. BUTTNER, A., 1952.—"Nouvelle démonstration d'un cycle abrégé chez *Ratzia joyeuxi* (Trematoda, Opisthorchiidae)." 234 (6), 673-675.
- b. DELAVALT, R., 1952.—"La teneur en acide désoxyribonucléique des noyaux sexuels chez un *Rhabditis* hermaphrodite." 234 (8), 884-885.

(12a) Buttner found 1%-2% of the prosobranch gastropod *Ammicola dupotetiana* in an irrigation ditch in the Jardin d'Essai in Algiers to be naturally infected with cercariae of *Ratzia joyeuxi*; metacercariae were found in the *Discoglossus* which were laying their eggs in the ditch. Experimentally 80% of the *A. dupotetiana* were infected by exposing them to miracidia obtained from infected *Alytes* tadpoles. About 200 cysts were fed to two *Cerastes cornutus* var. *mutila* and two *Vipera lebetina*; nine days later four immature *Ratzia joyeuxi* were recovered from the intestine of one of the blunt-nosed vipers, showing that three hosts are not essential for the completion of the life-cycle. S.W.

## 13—Experimental Parasitology. New York.

- a. BECK, J. W., 1952.—"Effect of gonadectomy and gonadal hormones on singly established *Hymenolepis diminuta* in rats." 1 (2), 109-117.
- b. MOORE, D. V. & MELENEY, H. E., 1952.—"Adaptability of *Schistosoma mansoni* of human origin to mice and hamsters." 1 (2), 157-160.
- c. KERR, K. B. & CAVETT, J. W., 1952.—"A technic for initial evaluation of potential anthelmintics." 1 (2), 161-167.
- d. HUNTER, III, G. W., KAUFMAN, Jr., E. H. & PAN, C., 1952.—"Studies on schistosomiasis. III. Copper oleate ointment in protection experiments against *Schistosoma japonicum*." 1 (2), 168-175.
- e. TODD, A. C., CROWDUS, D. H. & WYANT, Z. N., 1952.—"Experimental embryonation of the egg and development of *Ascaridia galli* in its chicken host." 1 (2), 176-183.
- f. McQUAY, Jr., R. M., 1952.—"Susceptibility of a Louisiana species of *Tropicorbis* to infection with *Schistosoma mansoni*." 1 (2), 184-188.
- g. HOPKINS, C. A., 1952.—"Studies on cestode metabolism. II. The utilization of glycogen by *Schistocephalus solidus* in vitro." 1 (2), 196-213.

(13a) In castrated male rats fed on a "complete" diet the decline in the number of eggs of *Hymenolepis diminuta* passed in the faeces daily over a period of three months was comparable with the effects of a "deficient" diet on normal males. In castrated male rats fed on a "deficient" diet there was a decline in the number of eggs which was comparable to that in normal females fed on a "deficient" diet. In castrated male rats egg output was restored to approximately normal by the administration of testosterone and progesterone at the rate of 1 mg. daily. In normal males and females on "deficient" diet, but not in gonadectomized rats, the egg output was raised by chorionic gonadotropin. Accidental infections with *Moniliformis dubius* were quickly lost on "deficient" diet. R.T.L.

(13b) In the faeces of mice and hamsters viable eggs of *Schistosoma mansoni* were present six to seven and a half weeks after exposure to infection by cercariae from *Australorbis glabratus*. These had been infected experimentally with miracidia hatched from eggs collected from stools of Puerto Ricans. There is therefore no need to assume that a gradual adaptation of human strains to mice and hamsters is necessary before these can become definitive hosts of *S. mansoni* in nature. R.T.L.

(13c) A simple and rapid *in vitro* procedure for testing compounds for anthelmintic properties against intestinal nematodes is described. Nicotine sulphate causes a paralysing effect with a contraction of the worm. There appears to be a correlation between anthelmintic activity and this "nicotine effect" on the muscular activity of *Ascaridia galli* as revealed by kymograph tracings. Atropine has a similar effect but causes a relaxation of the worm. Phenothiazine was the only chemical among the compounds tested which showed this "atropine effect"; chenopodium oil, tetrachlorethylene, carbon tetrachloride, hexylresorcinol and santonin were among the compounds showing the "nicotine effect". R.T.L.



(13d) Copper oleate ointment afforded complete protection against the cercariae of *Schistosoma japonicum* for 48 hours to mice and for eight hours to paddy workers. It is difficult to remove from the skin except by the application of ether. Its stickiness may soil clothing and thus deter man from using it. R.T.L.

(13e) Data are presented which indicate that during embryonation of the eggs of *Ascaridia galli* temperature as well as their physiological age influences their subsequent development in the definitive host. With eggs embryonated at 85°F. the worms were consistently smaller than those which developed from eggs embryonated at 65°F. to 78°F. The age of the host appeared also to restrict the percentage and size of *A. galli*. Worms developed from eggs cultivated in thyroprotein suspensions were larger and more numerous than those derived from eggs cultured in plain tap-water. R.T.L.

(13f) *Tropicorbis havanensis* raised in the laboratory from two snails collected at Baton Rouge in Louisiana proved susceptible to the Puerto Rican strain of *Schistosoma mansoni*. Cercariae were shed by 4.1% of 319 specimens but these *T. havanensis* were refractory to a baboon strain. *Australorbis glabratus* used as control was equally susceptible to both strains. Mice and hamsters exposed to infection with cercariae from *T. havanensis* and *A. glabratus* passed eggs from which infections were produced in both species of snail. R.T.L.

(13g) Plerocercoids of *Schistocephalus solidus* absorbed nutrient only when glucose was added to the medium. In horse serum, salines and peptone broth they starved. The rate of entry of glucose was independent of the external concentration above a threshold value below which there was no absorption. In non-nutrient media the amount of endogenous glycogen consumed during 24 hours was greater under anaerobic than under aerobic conditions. After that the presence or absence of oxygen had no observable effect. In all media there was a correlation between longevity and exhaustion of reserves. R.T.L.

#### 14—Extension Bulletin. University of Hawaii, College of Agriculture.

- a. ALICATA, J. E., 1952.—“Prevention and treatment of parasites in poultry and swine.” No. 53, 30 pp.

#### 15—Farmer and Stock-Breeder.

- a. ANON., 1952.—“Eelworm control areas named. New Order restricts crops in infested areas.” 66 (3254), 63.

(15a) Details are given of the new Order promulgated by the Ministry of Agriculture and Fisheries of England and Wales designed to control the spread of *Heterodera schachtii* in the infected portions of the sugar-beet areas of the Eastern Counties of England, by restricting the growing of susceptible crops. R.T.L.

#### 16—Geographical Review. New York.

- a. MAY, J. M., 1952.—“Map of the world distribution of helminthiases.” 42 (1), 98-101 + map.

(16a) In an introductory note to a map of the world distribution of the more important human helminthiases which forms the fourth plate of the Geographical Society's Atlas of Diseases, May explains that the species of helminths are grouped according to their mode of transmission to man by (i) ingestion, (ii) insect bites or (iii) skin penetration. He briefly summarizes the geographical factors, cultural and physical, which govern the epidemiological pattern. R.T.L.

#### 17—Journal of the American Veterinary Medical Association.

- a. RIVERA-ANAYA, J. D. & MARTÍNEZ DE JESÚS, J., 1952.—“An improved technique for the microscopic diagnosis of liver fluke infection in cattle.” 120 (901), 203-204.

(17a) Rivera-Anaya & Martínez de Jesús have simplified Swanson & Hopper's technique

for the detection of *Fasciola hepatica* eggs in faeces, by omitting several stages and increasing the rate of sedimentation by the addition of 1 ml. of a 1% solution of aluminium sulphate this does not affect the eggs. Standard 7% tincture of iodine (instead of 15%) is used for staining.

P.M.B.

### 18—Journal of Experimental Biology.

- a. HOBSON, A. D., STEPHENSON, W. & BEADLE, L. C., 1952.—“Studies on the physiology of *Ascaris lumbricoides*. I. The relation of the total osmotic pressure, conductivity and chloride content of the body fluid to that of the external environment.” 29 (1), 1-21.
- b. HOBSON, A. D., STEPHENSON, W. & EDEN, A., 1952.—“Studies on the physiology of *Ascaris lumbricoides*. II. The inorganic composition of the body fluid in relation to that of the environment.” 29 (1), 22-29.

(18a) Measurements of the total osmotic pressure, electrical conductivity and chloride concentration of the body fluid of *Ascaris lumbricoides* of the pig and of the intestinal contents of the pig confirm previous observations showing that this worm normally lives in a hypertonic medium. It is shown experimentally that water can pass both through the body wall and the wall of the alimentary canal. In different concentrations of sea water (20-40%) the osmotic pressure of the body fluid of the worms changes correspondingly but is always slightly above the saline medium. Its conductivity changes similarly but is always less than the medium. Its chloride concentration varies but is always less than that of the external medium. This ability to maintain the chloride concentration of the body fluid below that of the external medium is believed to be due to a mechanism which is resident in the body wall. The cuticle alone is freely permeable to chloride. An appendix to this paper describes the procedure in applying the freezing-point method of determining osmotic pressure in relation to *Ascaris* body fluid and intestinal fluid from the pig.

J.J.C.B.

(18b) It is shown that the sodium and potassium contents of the body fluid of *Ascaris lumbricoides* of the pig are variable but apparently independent of the variations of the external medium. The calcium and magnesium contents are relatively constant and not affected by those of the external medium. It is confirmed [see preceding abstract] that the chloride concentration of the body fluid is closely related to and always lower than that of the external medium.

J.J.C.B.

### 19—Journal of Helminthology.

- a. SANDOSHAM, A. A., 1952.—“An investigation into the association of creeping eruption with *Strongyloides* infection contracted in the Far East.” 26 (1), 1-24.
- b. STANDEN, O. D., 1952.—“The *in vitro* effect of normal and immune serum upon the cercariae of *Schistosoma mansoni*.” 26 (1), 25-42.
- c. GIBSON, T. E., 1952.—“The development of acquired resistance by sheep to infestation with the nematode *Trichostrongylus axei*.” 26 (1), 43-53.

(19a) In a study of 8 ex-prisoners-of-war from the Far East who had creeping eruption but no other helminth infection, Sandosham was unable to obtain direct evidence to substantiate or refute the theory that the condition was caused by the associated *Strongyloides* infection. Animal experiments and morphological studies excluded the probability that the *Strongyloides* belonged to any of the species *S. canis*, *S. cati*, *S. felis*, *S. fülleborni*, *S. rattus* or *S. papillosus*. Although it resembles *S. stercoralis* in morphology human volunteers could not be infected with cultures of the filariform larvae. It is suggested that this inability to infect man was probably due to loss of virility from senescence and continued auto-infection. The serpiginous or linear attacks of creeping eruption in these Far Eastern cases are attributed to the senescence of the parasite and to the development of local tissue immunity from repeated invasion of the affected area by infective larvae in exo-auto-infection. The relatively mild nature of the skin lesions may account for the fact that the condition has been overlooked in the indigenous population.

R.T.L.



(19b) Standen has investigated the effect of normal human serum (from adults and juveniles), immune human serum (from schistosomiasis cases returned to Great Britain), and animal sera (from cat, dog, cattle, horse, sheep, rabbit, hamster, guinea-pig and monkey) on cercariae of *Schistosoma mansoni*. He divides the reactions observed into 4 groups: A, moderately cercaricidal; B, strongly cercaricidal; C, non-cercaricidal; D, with the formation of an enveloping precipitate. A few reactions could not be classified. Of 502 normal human sera tested 65% were group A, 9% group B, 24% group C and 2% unclassified. A precipitate was formed with all the cattle sera, 3% of the cat, 28% of the dog, 31% of the sheep and 17 out of the 18 known cases of schistosomiasis. This could not be correlated with other helminth infections. The precipitate was not cercaricidal. Heat treatment and storage caused the disappearance of the cercaricidal factor. s.w.

(19c) Gibson has repeated the experiment carried out in 1945-1946 on acquired resistance of sheep to *Trichostrongylus axei*. Six pairs of twin lambs were used, one of each pair acting as control, the other being given the so-called "immunising" dose; this consisted of 10,000, 15,000 or 20,000 infective larvae given when the lambs were one month old. Four months later all lambs were given 40 daily doses of 4,000 infective larvae. It appeared that smaller doses increased resistance to the second infection, intermediate doses had no effect and higher doses decreased resistance. The weekly egg counts and weight gains of each lamb together with the worm burden at the end of the experiment are tabulated. s.w.

## 20—Journal of Parasitology.

- a. OLIVIER, L. & STIREWALT, M. A., 1952.—"An efficient method for exposure of mice to cercariae of *Schistosoma mansoni*." 38 (1), 19-23.
- b. KUNTZ, R. E., 1952.—"*Schistosoma mansoni* and *S. haematobium* in the Yemen, southwest Arabia: with a report of an unusual factor in the epidemiology of schistosomiasis mansoni." 38 (1), 24-28.
- c. READ, C. P., 1952.—"Human sparganosis in south Texas." 38 (1), 29-31.

(20a) Olivier & Stirewalt describe and illustrate a technique for exposing mice to *Schistosoma mansoni* cercariae which they claim is safer, more reliable and more efficient than other exposure techniques. Essentially it consists of immobilizing the mice on small boards with a hole at one end through which the tail is threaded so that it hangs into a suspension of cercariae. Two operators can expose mice to a known number of cercariae at the rate of 25 per hour. s.w.

(20b) Kuntz briefly reviews previous work on schistosomiasis in the Near East, other than Egypt. He then reports on a preliminary survey carried out in the Yemen during January and February, 1951 by investigators from the United States Naval Medical Research Unit No. 3 of Cairo, Egypt. Work was concentrated on three areas: Hodeida, a city on the Red Sea coast in the coastal plain, Ta'izz in the intermediate zone at an altitude of 4,100 ft., and San'a on the highland plateau at 7,200 ft. At Ta'izz the incidence of *Schistosoma mansoni* was high and a few people were infected with *S. haematobium*; the only sources of infection which were discovered were the ablution pools at three mosques in the city, about 35% of 75 *Biomphalaria boissyi arabica* collected from them being heavily infected with *S. mansoni*. The incidence in Hodeida was much lower and all the infected persons had recently come either from Eritrea or from parts of the Yemen outside Hodeida. No infected snails were found. At Ma'bar and San'a, no *S. haematobium* and very few *S. mansoni* infections were found; none of the *Bulinus contortus* examined were carrying *S. mansoni*. These observations are not in agreement with those of Sarnelli, 1935, who reported widespread urinary schistosomiasis in the San'a area. This is the first report which shows a clear cut relationship between religious practices and schistosomiasis. s.w.

(20c) A second case of human infection with *Sparganum mansoni* is reported from South Texas. A mass which measured  $3 \times 2 \times 1.5$  cm. was removed under local anaesthesia from the right breast. It contained a fine, white, filamentous object, 7.5 cm. long and about

## 20—Journal of Parasitology (cont.)

- d. SCHILLER, E. L., 1952.—"Studies on the helminth fauna of Alaska. IX. The cestode parasites of the white-fronted goose (*Anser albifrons*) with the description of *Hymenolepis barrowensis* n.sp." 38 (1), 32-34.
- e. GOLDBERG, A., 1952.—"Effects of the nematode *Oesophagostomum venulosum* on sheep and goats." 38 (1), 35-47.
- f. VAN CLEAVE, H. J. & TIMMONS, H. F., 1952.—"An additional new species of the acanthocephalan genus *Neoechinorhynchus*." 38 (1), 53-56.
- g. HAND, C. & VOGEL, M., 1952.—"*Ariolimax columbianus*, an intermediate host for *Brachylaemus virginiana* (Dickerson) (Trematoda: Digenea) in California." 38 (1), 57-58.
- h. BATTE, E. G. & SWANSON, L. E., 1952.—"Laboratory evaluation of organic compounds as molluscicides and ovocides, II." 38 (1), 65-68.

0.05 cm. in diameter. There was a well developed scolex resembling that of *Spirometra*. One month later, a second Sparganum was removed from a nodule in the left thigh. Reac recalls that in 1948 he reported *Spirometra mansonoides* from domestic and wild cats, presumably *Lynx rufus*, from the same area and he supports the view that many of the cysts and fatty tumours found under the skin in the U.S.A. may be due to Sparganum.

R.T.L.

(20d) Schiller records that 12 out of 35 *Anser albifrons* from Point Barrow, Alaska, were parasitized by two species of *Hymenolepis*. The first, which occurred in four birds, was identified as *H. creplini*; the second, which occurred in eight birds, is a new species, *H. barrowensis* n.sp. and is described and illustrated. *H. barrowensis* differs from the three most closely related species in a number of characters: from *H. setigera* in having a shorter strobila, a deeply lobed ovary, no vaginal sphincter and smaller rostellar hooks; from *H. bilateralis* in having smaller and differently shaped rostellar hooks; from *H. ardeae* in having a shorter strobila, a larger cirrus sac and rostellar hooks of a different shape.

S.W.

(20e) Although *Oesophagostomum venulosum* frequently occurs in sheep and goats in the U.S.A., there has been little experimental work on its effects on these hosts. The experimental administration to lambs of 500 or more larvae was sufficient to cause symptoms. There was a slight interference in weight gain when more than 4,000 larvae were administered, but the only lesions noted post mortem were petechiae, nodules 1-2 mm. in diameter and minor adhesions. The larvae did not remain in the gut wall long enough to cause serious local lesions. Fewer mature worms were present in reinfections than in initial infections, and in one case the worms remained immature longer after reinfection than after the initial infection. The greater the initial infection and the more extended the period of administration, the greater was the resistance to reinfection after the termination of the initial infection. This resistance was maintained for at least four months by one lamb.

R.T.L.

(20f) *Neoechinorhynchus prolixus* n.sp. from the river carpsucker, *Carpiodes carpio*, of Lake Texoma, differs from *N. cristatus* and *N. rutili* in a number of measurements. The hooks on the proboscis differ in size from those in *N. venustus*, *N. australis* and *N. distractus*.

R.T.L.

(20g) A high proportion of *Ariolimax columbianus* collected in Alameda Co., California, harboured the metacercariae of *Brachylaemus virginiana* of which the opossum is the definitive host. Other gastropods were negative.

R.T.L.

(20h) Of 98 compounds tested against limnaeid snails for molluscicidal activity in concentrations varying from 1:100,000 to 1:1,200,000 based on active ingredients, only pentachlorophenol, 2,4-dinitro-6-phenylphenol and dinitro-*o*-cyclohexylphenol caused 100% mortality after 24 hours' exposure to 1 p.p.m. The results obtained with 32 compounds are tabulated. Apparently the toxicity of the chlorophenol compounds is directly proportional to the degree of chlorination of the phenol radicle. Several organic compounds were also tested against fluke eggs. After exposure for 24 hours to 2.5 p.p.m. of sodium pentachlorophenolate, and to 5 p.p.m. of dinitro-*o*-cyclohexylphenol, dicyclohexylamine salt, or sodium 2,4,5-trichlorophenolate, the fluke eggs failed to hatch.

R.T.L.



## 20—Journal of Parasitology (cont.)

- i. LUCKER, J. T., 1952.—“*Thelandros alatus* Wedl, 1862 (Nematoda: Oxyuridae) and its synonyms.” 38 (1), 69–75.
- j. MOORE, D. V. & MELENEY, H. E., 1952.—“Susceptibility of rice rats (*Oryzomys palustris*) to *Schistosoma mansoni*.” 38 (1), 76–79.
- k. LINDQUIST, W. D., 1952.—“Infections of *Ancylostoma caninum* in abnormal hosts.” 38 (1), 80–82.
- l. BALL, L., 1952.—“Notes on helminth parasites of muskrats from western Colorado.” 38 (1), 83–84.
- m. GREGOIRE, E. & PRATT, I., 1952.—“Helminth parasites of the petrale sole.” 38 (1), 84.
- n. MAPES, C. R., 1952.—“*Cionella lubrica* (Muller), a new intermediate host of *Dicrocoelium dendriticum* (Rudolphi, 1819) Looss, 1899 (Trematoda: Dicrocoeliidae).” 38 (1), 84.
- o. GAAFAR, S. M., 1952.—“Incidence of infection with the fowl nematode *Ascaridia galli* in Egyptian chickens.” 38 (1), 84–85.
- p. GOLDMAN, M. & JOHNSON, S., 1952.—“Intestinal parasite surveys in Georgia.” 38 (1), 86–87.

(20i) Lucker redescribes the male genital region of *Thelandros alatus* and accepts Seurat's concept of the species. He suppresses *T. micruris*, *T. sahariensis* and *T. avis* as synonyms of *T. alatus*. R.T.L.

(20j) Adult *Schistosoma mansoni* and viable eggs were recovered in small numbers after experimental infections of the rice rats, *Oryzomys palustris palustris* and *O. p. natator*. Eggs were passed in the faeces seven weeks after exposure to infection with 250 cercariae and were still present after 41 weeks. It is suggested that reservoir hosts other than the monkey may exist or be developed. R.T.L.

(20k) After experimental infection of both laboratory rats and cotton-rats, the larvae of *Ancylostoma caninum* became encapsulated in nodules in the reticular layer of the derma but not in the lungs, although there was intense lung damage with profuse haemorrhage and general hyperactivity of the leucocytes and wandering cells 26 hours after infection. The results are contrasted with those induced by *Nippostrongylus muris* larvae. R.T.L.

(20l) A much smaller number of helminth species occurred in muskrats (*Ondatra zibethica osoyoensis*) in Gunnison and Hinsdale counties, Colorado, two comparatively isolated regions on the western slope of the Rockies at altitudes of 7,800–8,663 ft., than at lower altitudes. R.T.L.

(20m) Encysted larval Ascaridae probably belonging to *Anisakis* or *Porrocaecum* occurred in 43%, and *Lecithochirium exodicum* were recovered from 28% of the 213 petrale soles, *Lopsetta jordani*, examined at the Oregon Institute of Marine Biology, Charleston. R.T.L.

(20n) Mapes has examined 16 species of molluscs belonging to nine families for infection with *Dicrocoelium dendriticum*. These were collected from a farm in New York State where a flock of sheep, heavily infected with *D. dendriticum*, had grazed for several years. None of the known intermediaries occur there. *Cionella lubrica*, a terrestrial snail, was the only species found naturally infected. S.W.

(20o) Of 200 chickens killed at the Kasr El-Eini hospitals in Egypt, 172 had helminth parasites. Of these 111 were infected with *Ascaridia galli*, the numbers ranging in individual birds from one to over one hundred. R.T.L.

(20p) In a relatively homogeneous group of 926 adults and children in Atlanta, Georgia, the helminths found were *Hymenolepis nana* in nine individuals, hookworm in eight, *Ascaris lumbricoides* in three, *Trichuris trichiura* in three, *Strongyloides stercoralis* in one. Of the 145 children examined in addition for *Enterobius* by a single cellulose tape slide preparation, 34 (23.4%) were positive. R.T.L.

## 20—Journal of Parasitology (cont.)

- q. HUNTER, W. S. & CHAIT, D. C., 1952.—“Notes on excystment and culture *in vitro* of the microphallid trematode, *Gynaecotyla adunca* (Linton 1905).” 38 (1), 87.
- r. SCOTT, J. A. & BLYNN, E., 1952.—“Observations on infections in the cotton rat with *Longistriata adunca* and *Strongyloides sigmodontis*.” 38 (1), 88.
- s. LI, S. Y., 1952.—“On a new host, black rat, of *Fasciola hepatica*.” 38 (1), 88.
- t. JONES, M. F. & NEWTON, W. L., 1952.—“The cercaricidal efficacy of ozone.” 38 (1), 88–89.
- u. EADS, R. B. & HIGHTOWER, B. G., 1952.—“Blood parasites of southwest Texas rodents.” 38 (1), 89–90.
- v. SCOTT, J. A., 1952.—“A humidity chamber for maintaining the tropical rat mite, *Bdellonyssus bacoti*.” 38 (1), 90–91.
- w. SCHWARTZ, B., 1952.—“Livestock parasitology in the United States.” 38 (2), 93–104.
- x. MARTIN, W. E. & BAMBERGER, J. W., 1952.—“New blood flukes (Trematoda: Spirorchidae) from the marine turtle, *Chelonia mydas* (L.).” 38 (2), 105–110.

(20q) Hunter & Chait have described a technique for inducing the metacercariae of *Gynaecotyla adunca* to excyst and for culturing the adults. Various media were tried but 1% sea water (salinity 10 parts per thousand, pH 7.4–7.7) incubated at 40°C. proved to be the most satisfactory. Spermatozoa appeared in the cirrus one to three hours after excystment and normal eggs were shed within 80 hours. The maximum time of survival in culture was eight days. S.V.

(20r) Scott & Blynn found that all of 20 cotton-rats caught in Galveston County were naturally infected with *Longistriata adunca*, and half of them with *Strongyloides sigmodontis*. If nesting material was not removed until after weaning, all the litters became infected with *L. adunca* but none with *S. sigmodontis*. The free-living larvae of *L. adunca* were essentially the same as those of *L. musculi*. S.V.

(20s) Li found two mature specimens of *Fasciola hepatica* in the liver of one out of thirty six *Rattus rattus* examined in Taipei, Formosa. This is a new host record. S.V.

(20t) Jones & Newton have carried out four experiments on the effect of ozone on cercariae of *Schistosoma mansoni*. Ozone was applied at concentrations of approximately 0.1–1.3 parts per million. At concentrations as low as 0.3 p.p.m., cercariae were either killed within one minute or died within half-an-hour; at 0.2 and 0.1 p.p.m. they were not killed within one minute but died 30–60 minutes later. S.V.

(20u) Of over 1,700 rodents examined, 40 out of 461 *Neotoma micropus* had microfilariae of *Litomosoides*; in 106 out of 400 *Sigmodon hispidus*, in 2 out of 23 *Peromyscus leucopus* and in one out of 14 *Citellus mexicanus* there were microfilariae. R.T.J.

(20v) Scott describes a technique for maintaining *Bdellonyssus bacoti* infected with *Litomosoides carinii* until the larvae have reached the infective stage. S.V.

(20w) Schwartz recalls the early investigations on internal parasites and the later contributions by the Bureau of Animal Industry to the study of the morphology, the taxonomy and life-cycles of the helminths of domesticated animals, and to our knowledge of new anthelmintics. R.T.J.

(20x) Two species of blood flukes were obtained from the mesenteric veins of two marine turtles (*Chelonia mydas*) caught at the entrance to Santa Maria Bay, Lower California. The flukes are described and named *Haemoxenicon stunkardi* n.g., n.sp. and *H. chelonenecon* n.sp. They differ chiefly in body shape and length. The shortest specimen of the former is 1 times the length of the longest specimen of the latter. The characters which differentiate *Haemoxenicon* from the closely related *Carretacola* are the more elongated eggs, the presence of a common genital pore, a minute dorsal Laurer's pore and the absence of a vagina. R.T.J.



## 20—Journal of Parasitology (cont.)

- y. FREEMAN, R. S., 1952.—"The biology and life history of *Monoecocestus* Beddard, 1914 (Cestoda: Anoplocephalidae) from the porcupine." 38 (2), 111-129.
- z. STABLER, R. M., 1952.—"Parasitism of mosquito larvae by mermithids (Nematoda)." 38 (2), 130-132.
- ba. RAUSCH, R., 1952.—"Helminths from the round-tailed muskrat, *Neofiber alleni nigrescens* Howell, with descriptions of two new species." 38 (2), 151-156.
- bb. NAJARIAN, H. H., 1952.—"A new xiphidiocercaria, *C. goodmani*, from *Lymnaea palustris*." 38 (2), 157-160.
- bc. UZMANN, J. R., 1952.—"*Cercaria myae* sp. nov., a fork-tailed larva from the marine bivalve, *Mya arenaria*." 38 (2), 161-164.
- bd. PATTEN, J. A., 1952.—"The life cycle of *Conspicuum icteridorum* Denton and Byrd, 1951, (Trematoda: Dicrocoeliidae)." 38 (2), 165-182.
- be. FAHMY, M. A. N., 1952.—"New records of ecto and endoparasites of chickens in Egypt with special reference to the taxonomy of *Subulura brumpti*." 38 (2), 184.

(20y) The development of *Monoecocestus* spp. in oribatid mites is described and illustrated. Eleven species of mites were experimentally infected with *M. americanus* and four species with *M. variabilis*. Porcupines were experimentally infected with cysticercoids of both species.

R.T.L.

(20z) Larval mermithids which infected the fourth instar larvae of *Aedes vexans*, *Culex pipiens* and *C. pipiens* at Cobb's Creek, Pennsylvania, caused the death of their hosts when they emerged normally from the thorax. The genus and species of the worms have not been determined.

R.T.L.

(20ba) The four species of helminths collected from two round-tailed muskrats (*Neofiber alleni nigrescens*) were *Cittotaenia praecoquis*, *Cysticercus lyncis* and two now described as new. In *Quinqueserialis floridensis* n.sp. the vitellaria consist of two lateral bodies, largely posterior to the uterine coils which extend laterally well beyond the lateral margins of the vitellaria and vitellaria. *Paranoplocephala neofibrinus* n.sp. is differentiated from related species by the size of the eggs and the cirrus sac.

R.T.L.

(20bb) *Cercaria goodmani* n.sp. was present in 12.6% of *Lymnaea palustris* collected at Ann Arbor, Michigan, and is a new xiphidiocercaria belonging to Brooks' Conniae division of Polyadena.

R.T.L.

(20bc) *Cercaria myae* n.sp. obtained from the soft clam, *Mya arenaria*, belongs to the cercarcous group, but its taxonomic position is not yet ascertainable. It closely resembles *C. discursata* but whereas *C. discursata* sheds its forked tail while still in the sporocyst, *C. myae* has a marked natatory ability.

R.T.L.

(20bd) Details are given of the various stages in the life-cycle of *Conspicuum icteridorum* and *Zonitoides arboreus* as the first intermediary, and of the metacercaria in its second intermediate host, the isopods *Oniscus asellus* and *Armadillidium quadricornis*. When fed to the definitive host, *Quiscalus quiscula*, adult worms were recovered from the gall bladder about twelve weeks later.

R.T.L.

(20be) Poultry collected around Cairo contained 10 species of helminths, viz., *Echinostoma revolutum*, *Echinoparyphium recurvatum*, *Railletina* (R.) *echinobothrida*, R. (R.) *tetragona*, *Notugnia digonopora*, *Choanotaenia infundibulum*, *Ascaridia galli*, *Heterakis gallinae*, *Subulura brumpti* and *Acuaria* (*Dispharynx*) *spiralis*. The genus *Subulura* does not fit into any of the superfamilies Oxyuroidea, Ascaroidea or Strongyloidea. If further study of the life-cycle of this and allied genera shows that the intermediate hosts are arthropods, it may be necessary to erect a new superfamily.

R.T.L.

## 20—Journal of Parasitology (cont.)

- bf. ZAIMAN, H., LEEDY, W. & HOWARD, P., 1952.—“The incidence of *Enterobius vermicularis* in a metropolitan San Francisco pre-school nursery population.” 38 (2), 184–185.  
 bg. CLAPP, R. L., 1952.—“A new host and distribution record for the nematode parasite: *Skrjabinylus nasicola* (Leuckart 1842).” 38 (2), 185.

(20bf) Seventy-six children of a pre-school nursery population in San Francisco were examined by modified NIH swabs on rising each morning for six consecutive days. 55% of those aged two years, 65% of those three years old and 54% of the four-year-olds were found to be infected with *Enterobius vermicularis*. R.T.L.

(20bg) *Skrjabinylus nasicola* is recorded for the first time in the frontal sinus of *Mustela frenata effera* trapped near Tollgate, Umatilla County, Oregon. R.T.L.

## 21—Journal of the Washington Academy of Sciences.

- a. LOCKER, B. & RAUSCH, R., 1952.—“Some cestodes from Oregon shrews, with description of four new species of *Hymenolepis* Weinland, 1858.” 42 (1), 26–31.  
 b. SCHILLER, E. L., 1952.—“*Hymenolepis johnsoni*, n.sp., a cestode from the vole *Microtus pennsylvanicus drummondii*.” 42 (2), 53–55.

(21a) The cestodes *Protogynella blarinae*, *Hymenolepis falculata* and *H. schilleri* from shrews in Oregon are recorded from the western part of North America for the first time, and four species of *Hymenolepis* are described as new, viz., *H. macyi* n.sp., differentiated from other unarmed species by the gross appearance of the strobila, by the position and size of the cirrus sac, the arrangement of testes and ovary and the size of the egg. In *H. kenki* n.sp. the testes are arranged in a straight line; the size and relative length of the cirrus sac and the size of the egg are additional characteristics. *H. sphenomorphus* n.sp. has a very small wedge-shaped strobila; it differs from other *Hymenolepis* species with 10 hooks in hook size and shape, size and location of cirrus sac and possesses a strongly developed cirrus with a spined terminal knob. *H. intricatus* n.sp. is differentiated from other species with 10 hooks by the hook size and shape, size and position of cirrus sac and especially by the vagina, in which a bulb-like heavily spined section adjoins a terminal funnel-like structure supported by rigid spicules. These new species were collected from *Sorex v. vagrans* in Oregon. R.T.L.

(21b) *Hymenolepis johnsoni* n.sp. from *Microtus pennsylvanicus drummondii* at Fort Rae, District of Mackenzie, Canada, has a single row of 10 rostellar hooks 15  $\mu$  long. The strobila is 30–40 mm. in length. The ovary is deeply lobed. The three ovoid testes are arranged in a triangle with one testis polar. The cirrus is armed with minute spines. R.T.L.

## 22—Lancet.

- a. WHELAN, J. P. F. & CHEEK, E., 1952.—“Anaemia in Africans.” [Correspondence.] *Yea* 1952, 1 (6707), 566.

(22a) Whelan & Cheek report on hookworm anaemia in Southern Indian estate labourer in Malaya. They found that in cases with a moderate infection and on a low protein diet it was possible to raise the mean haemoglobin level from 4 gm. per 100 ml. to about 9 gm. per 100 ml. by means of oral iron, bed rest and hospital diet. S.W.

## 23—Lebensmittel-tierarzt. [Supplement to Deutsche Tierärztliche Wochenschrift.]

- a. HEYDT, R., 1952.—“Die Beurteilung der von *Dicrocoelium lanceatum* befallenen Organe im Rahmen der Fleischuntersuchung.” 3 (3), 22–23.  
 b. SCHÖNBERG, F., 1952.—[*Sarcocystis miescheriana* infection in a pig diagnosed during Trichinella inspection.] 3 (3), 32.

(23a) Heydt draws attention to the importance of *Dicrocoelium dendriticum* infection in sheep and goats which he considers to be on the increase in Germany. More care is necessary to identify this infection in livers at meat inspection since the lesions are not so gross as in



fascioliasis. Heavily infected livers should be condemned: lightly infected ones should be placed in boiling water for at least 15 minutes before being passed as suitable for consumption.

A.E.F.

(23b) Schönberg contributes a brief note on a *Sarcocystis miescheriana* found in a pig during routine *Trichinella* inspection. Since this parasite can easily be pressed out of the muscle fibres and the spores are clearly visible beneath the outer membrane confusion with *Trichinella* is "not possible".

A.E.F.

## 24—Medical Journal of Australia.

- a. NOVI, S., 1952.—"Thread-worms." [Correspondence.] 39th Year, 1 (3), 92.

(24a) Novi reports that a case of *Enterobius* infection in a child was cured by reducing the carbohydrates and increasing the proteins in the diet. The infection had not yielded to treatment with a number of proprietary anthelmintics.

S.W.

## 25—Mikrokosmos.

- a. HAGER, R., 1952.—"*Leucochloridium paradoxum*—der Saugwurm im Schneckenfühler." 41 (5), 115-117.

(25a) Hager gives a semi-popular account of the life-history of *Leucochloridium paradoxum*. The adult worm parasitizes the rectum of robins; eggs are passed out in the faeces and (when they fall on leaves) are eaten by snails. Sporocysts and cercariae develop in the intermediate host, the latter migrating to the tentacles which become distended and make pulsating movements. Robins apparently mistake the infected tentacles for insect larvae and thus complete the life-cycle.

A.E.F.

## 26—Nature. London.

- a. STANILAND, L. N. & STONE, L. E. W., 1952.—" 'Solubilized' chemicals for the control of plant nematodes." [Correspondence.] 169 (4297), 420.  
 b. GOODEY, T., 1952.—"Eelworm galls mistaken for ergot in flowers of Canadian grasses." [Correspondence.] 169 (4298), 456-457.  
 c. YOSUFZAI, H. K., 1952.—"Female reproductive system and egg-shell formation in *Fasciola hepatica* L." [Correspondence.] 169 (4300), 549.  
 d. TRAUB, R., WISSEMAN, Jr., C. L. & AUDY, J. R., 1952.—"Preliminary observations on a repellent for terrestrial leeches." [Correspondence.] 169 (4303), 667-668.

(26a) Staniland & Stone report that toxicity of chlorophenol and other chemicals to eelworms is increased by using them in the "solubilized" form produced by the addition of detergents of the long-chain alkyl sulphate type. These solutions also have the advantage of increased wetting and penetration of the soil, eelworm cysts and egg-shells.

S.W.

(26b) Conspicuous flask-shaped flower galls on the grasses *Arctagrostis latifolia* from Southampton Island and Baffin Island, and *Dupontia fisheri* from Chesterfield Inlet, N.W.T. in Canada, contained nematodes of the genus *Anguina*. Their specific determination is deferred.

R.T.L.

(26c) Yosufzai has demonstrated the presence of a wide, elliptical chamber in the central region of the shell gland in *Fasciola hepatica*. In this chamber vitelline granules, vitelline cells, the secretion of the shell gland and oocytes are mixed together and the egg-shell is formed. He is of the opinion that the secretion of the shell gland does form the egg-shell, the vitelline cells and granules forming a temporary support and later supplying nutriment to the developing miracidium. He does not agree with the modern tendency to substitute the term "Mehlis' gland" for "shell gland".

S.W.

(26d) The new repellent M-1960 (equal parts of N-butylacetanilide, 2-butyl-2-ethyl-1,3-propanediol and benzyl benzoate with 10% of an emulsifying agent) used by the U.S.

Army for impregnating clothing against mites, mosquitoes and fleas has proved highly repellent against the land leech, *Haemadipsa zeylanica*, in North Borneo. Treated clothing still retains its repellent action when worn during and after heavy rains, and after washing four or five times with soap in cold water. Its action is completely nullified when treated trousers are covered by plastic leggings.

R.T.L.

## 27—Nature. Paris.

- a. SENET, A., 1952.—“Un petit ver du chien dangereux pour l'homme: la ténia échinocoque.” No. 3203, pp. 94-95.

## 28—North American Veterinarian.

- a. REBRASSIER, R. E., 1952.—“Parasitic diseases.” 33 (3), 177-180.
- b. COOPERRIDER, D. E., 1952.—“Observations on diagnosis of parasites of small animals—I.” 33 (4), 253-255.

(28a) This résumé of parasitic diseases of dogs briefly summarizes anthelmintic treatments for the removal of whipworms [which the author names *Trichinella*!], ascarids, hookworms and tapeworms.

R.T.L.

(28b) There are great differences in the counts of helminth eggs obtained by direct smear examination of faeces and by flotation, especially as applied to canine faeces. Tabulated results show that while direct smears gave 42.37% positive, flotation gave 62.42%. Of 613 dogs examined at Athens, Georgia, *Ancylostoma caninum* occurred in 262, *Trichuris vulpis* in 103, ascarids in 93 and tapeworms in 17.

R.T.L.

## 29—Parasitology.

- a. CROFTON, H. D., 1952.—“The ecology of immature phases of trichostrongyle nematodes. IV. Larval populations on lowland pastures.” 42 (1/2), 77-84.
- b. CABLE, R. M., 1952.—“On the systematic position of the genus *Deropristis*, of *Dihemistephanus sturionis* Little, 1930, and of a new digenetic trematode from a sturgeon.” 42 (1/2), 85-91.
- c. REES, G., 1952.—“The structure of the adult and larval stages of *Plagiorchis (Multiglandularis) megalorchis* n.nom. from the turkey and an experimental demonstration of the life history.” 42 (1/2), 92-113.
- d. REES, G., 1952.—“Spiral torsion in *Taenia taeniaeformis* (Batsch, 1786) caused by the knotting together of two worms.” 42 (1/2), 114-124.
- e. SARWAR, M. M., 1952.—“On the synonymy of *Marshallagia orientalis* (Bhalerao, 1932) with *Marshallagia marshalli* and a record of its occurrence from the mountainous region of the Punjab.” 42 (1/2), 125.
- f. DUTT, S. C. & SRIVASTAVA, H. D., 1952.—“On the morphology and life history of a new mammalian blood-fluke—*Ornithobilharzia dattai* n.sp. (Preliminary report.)” 42 (1/2), 144-150.

(29a) In a study of trichostrongylid infestation of lowland pastures, Crofton finds that the time of maximum infestation differs from year to year and that the variation in the time of maximum infestation between different fields in the same year is greater than between years for the same field. Larval counts made on pastures where diseases had occurred were reasonably close to those estimated by Taylor. No larvae were recovered from fields which had been ploughed and reseeded. Although the concentration of larvae on the herbage of reseeded pastures remained low in spite of increased rate of stocking, the total population was considerable and, as many could probably overwinter, heavy grazing in the succeeding season would probably prove dangerous. The theoretical frequencies expected from Poisson distribution and those calculated from Neyman's contagious distribution type A formula are compared with the frequency distribution of larvae in samples taken by Taylor's method. A table shows that the frequencies calculated by Neyman's formula agree fairly closely with those actually observed.

R.T.L.

(29b) Cable describes and illustrates *Pristotrema manteri* n.g., n.sp. from *Scaphirhynchus platyrhynchus*. This genus is closely related to *Deropristis* but differs from it in a number of characters, including the arrangement of the cuticular spines, the shape of the genital atrium



and the relative positions of the testes. From consideration of this material and the description of *Dihemistephanus sturionis* Little, 1930, nec Looss, 1901, Cable concludes that this species is more nearly related to *Deropristis* and *Pristotrema* than to the type species of the genus *Dihemistephanus*, *D. lydiae*. He therefore erects the genus *Pristicola* n.g. for *D. sturionis*. The diagnosis of the subfamily Deropristiinae is emended to include *Pristotrema* and *Pristicola*.

S.W.

(29c) Rees describes and illustrates the adult and larval stages of *Plagiorchis* (*Multiglandularis*) *megalorchis* nom.nov. from turkey poultts which died on a farm in Wales. This species seems to be identical with the material collected by Foggie in 1937 from turkeys in Northern Ireland, which he identified as *P. laricola*. As no description of *P. laricola* is available, Rees proposes the new name *P. (Multiglandularis) megalorchis* until a comparison can be made. *Limnaea pereger* is shown to be the first intermediary and a number of insect larvae (*Chironomus riparius*, *Culicoides stigma*, *C. nubeculosus* and *Anatopynia (Psectrotanytus) varius*) act as second intermediaries. The life-cycle was completed experimentally by feeding infected insect larvae to two turkey poultts; mature worms were recovered from the small intestine seven days after infection.

S.W.

(29d) Rees outlines the normal arrangement of the organs in *Taenia taeniaeformis*. She then describes and figures the changes which resulted from abnormal growth in the parts of the strobilae of two specimens which had, apparently, become knotted together fairly early in their growth.

R.T.L.

(29e) A re-examination of Bhalerao's original material of *Marshallagia orientalis* showed that it is a synonym of *M. marshalli*. When submitted to cover slip pressure, its spicules assumed the form of those of *M. marshalli*. The eggs of Bhalerao's specimens fall within the range of those given by Mönig for *M. marshalli* and have their characteristic appearance. *M. marshalli* is now recorded from the Punjab.

R.T.L.

(29f) Dutt & Srivastava describe and illustrate the morphology of *Ornithobilharzia dattai* n.sp. from *Bos bubalus* and *B. indicus* at Bareilly, India, and of its cercaria from *Limnaea luteola*. Guinea-pigs and two calves were experimentally infected. The cuticle in the adult is smooth and the paired intestinal caeca are longer than the common caecum; the ovary lies in the posterior half of the body and the uterus contains a single asymmetrically oval egg with a terminal spine. Eggs from the uterus measured 0.073-0.11 mm. × 0.023-0.04 mm., those in the tissues and faeces of the host 0.12-0.137 mm. × 0.043 mm. In the male, the testes number from 37 to 66. The cercaria can be distinguished from the cercariae of *Schistosoma* spp. by a number of characters which are listed by the authors.

S.W.

### 30—Phytopathology.

- †a. BAINES, R. C. & CLARKE, O. F., 1952.—“Some effects of the citrus-root nematode on the growth of orange and lemon trees.” 42 (1), 1.  
†b. CAIRNS, E. J., 1952.—“Nematode diseases and their control in mushroom crops.” 42 (1), 4.

(30a) [For fuller account see No. 9a above.]

(30b) Commercial mushroom crops suffer considerably from attack by species of *Ditylenchus*, *Aphelenchus* and *Aphelenchoides* which feed upon and destroy the mushroom hyphae. When *Rhabditis* spp. are present in enormous numbers as saprophytes the bacteriological population is increased. These nematodes may convey spot-producing organisms on to the fruiting bodies. The best means of controlling nematode infestation of the mushroom house, bed structures and casing soil is by steam or steam and formaldehyde after the dormant nematodes have been activated by soaking for 24-48 hours. Compost in the beds is treated by steaming to pasteurizing temperatures and casing soil by steaming to over 150°F. for 15-20 minutes or by using soil fumigants in special bins.

R.T.L.

† Abstract of paper presented at the 43rd Annual Meeting of the American Phytopathological Society, Cincinnati, December 10-12, 1951.

## 30—Phytopathology (cont.)

- †c. CRALLEY, E. M. & FRENCH, R. G., 1952.—“Studies on the control of white tip of rice.” 42 (1), 6.
- †d. CRITTENDEN, H. W., 1952.—“Comparison of two nematocides used at the time of planting a winter cover crop.” 42 (1), 6.
- †e. CRITTENDEN, H. W., 1952.—“Resistance of asparagus to *Meloidogyne incognita* var. *acrita*.” 42 (1), 6.
- †f. GRAHAM, T. W., 1952.—“Nematodes as ectoparasites on tobacco, cotton, and other plants.” 42 (1), 9.
- †g. LOWNSBERY, B. F. & LOWNSBERY, J. W., 1952.—“*Paratylenchus hamatus* Thorne & Allen associated with celery disease in Connecticut.” 42 (1), 13.
- †h. MULLIN, R. S., 1952.—“Control of cracking in sweet potato by soil fumigation.” 42 (1), 15.
- †i. NUSBAUM, C. J. & CHAPLIN, J. F., 1952.—“Reduction of the incidence of black shank in resistant tobacco varieties by soil fumigation.” 42 (1), 15.

(30c) *Aphelenchoides oryzae*, the cause of white tip in rice, is spread by the seed. It is not carried over from one season to another in the soil. Infection is reduced as the age of the seed is increased. Seed treatment by (i) parathion dust (25%) and Systox on carbon dust (50%) at 2 oz. per bushel, (ii) soaking for twelve hours in 1:1,000 aqueous solution of mercuric chloride, (iii) methyl bromide fumigation and (iv) Aagrano dust at the rate of 2 oz. per bushel resulted in significant reductions in the severity of the disease. R.T.I.

(30d) In a field test, 14 days after seeding with rye and rye-grass as a winter cover crop, ethylene dibromide at the rate of 16, 26 and 36 gallons per acre reduced the stand by 12%, 9% and 14% respectively under that of the controls. With D-D mixture at 13, 20 and 27 gallons per acre, the reduction was 38%, 33% and 53% respectively. In green-house tests on rye, ethylene dibromide was the less toxic. R.T.I.

(30e) *Asparagus officinalis*, grown in soil heavily infested with *Meloidogyne incognita* var. *acrita*, in a green-house and in a field, showed no hypertrophy of the roots. Females containing egg-sacs which were found on microscopical examination averaged one per plant. Cantaloupes in the same soil were heavily knotted. Although *Asparagus* has been reported as heavily infested by root-knot nematodes, these results suggest that it is a suitable crop for infested soil. R.T.I.

(30f) Ectoparasitic nematodes are important on tobacco, cotton, maize and other plants in the south-east of the U.S.A. High populations of *Belonolaimus* sp., *Tylenchorhynchus* sp., *Rotylenchus* sp. and *Trichodorus* were recovered by Christie's soil screening technique. In pots of steamed soil *Rotylenchus* cultures caused stunting and root decay in cotton, tobacco and tomatoes. *Belonolaimus* caused severe disease in maize and cow-peas but not in tobacco. Disease was produced in tobacco by *Tylenchorhynchus* cultures and in maize and cow-peas by *Trichodorus*. The nematodes increased greatly and produced field symptoms. The inoculated species remained free from other nematode parasites. R.T.I.

(30g) *Paratylenchus hamatus* which has previously been reported in California from the fig has been found in fields of stunted and chlorotic celery. In 250 c.c. of soil there were from 1,000 to 8,000 of these nematodes. The stunting and necrosis of the roots was proportional to the nematode population. The adults and larvae survived the winter. Methyl bromide treatment of infested soil increased the weight of pot grown celery by four times that of the controls. R.T.I.

(30h) The application of D-D mixture by hand injector reduced cracking in sweet potatoes to 14.69% as compared with 51.18% in non-treated soil, although nematodes were present in the rootlets and potatoes in both treated and untreated areas. R.T.I.

(30i) Ethylene dibromide applied for nematode control at the rate of 20 gallons per acre had little effect on the development of black shank in susceptible varieties of tobacco, but reduced its incidence in resistant varieties. R.T.I.

\* Abstract of paper presented at the 43rd Annual Meeting of the American Phytopathological Society, Cincinnati, December 10-12, 1951.



## 30—Phytopathology (cont.)

- †j. OTEIFA, B. A., 1952.—“Effect of potassium nutrition and amount of inoculum on rate of reproduction of the root-knot nematode *Meloidogyne incognita*.” 42 (1), 15-16.
- †k. SASSER, J. N., 1952.—“Identification of root-knot nematodes (*Meloidogyne* spp.) by host tests.” 42 (1), 17-18.
- †l. TARJAN, A. C., 1952.—“Life histories of the root-knot nematodes.” 42 (1), 20.
- †m. TODD, E. H. & ATKINS, Jr., J. G., 1952.—“Laboratory culture of the rice white tip nematode, and inoculation studies.” 42 (1), 21.
- \* n. BAINES, R. C. & THORNE, G., 1952.—“The olive tree as a host of the citrus-root nematode.” 42 (2), 77-78.
- o. MAI, W. F., 1952.—“Temperature in relation to retention of viability of encysted larvae of the golden nematode of potato, *Heterodera rostochiensis* Wollenweber.” [Abstract of paper presented at the 6th Annual Meeting of the Northeastern Division of the American Phytopathological Society, West Springfield, Mass., November 6-7, 1951.] 42 (2), 113.
- p. TARJAN, A. C., 1952.—“Awl nematode injury on Chinese waterchestnuts.” [Abstract of paper presented at the 6th Annual Meeting of the Northeastern Division of the American Phytopathological Society, West Springfield, Mass., November 6-7, 1951.] 42 (2), 114.

(30j) [This paper appears in full in *J. Wash. Acad. Sci.*, 41, 393-395. For abstract see *Helm. Abs.*, 20, No. 463b.]

(30k) The host range of the five species of *Meloidogyne* known to occur in the U.S.A. was tested on about 25 agronomic crops. Susceptibility was estimated by a comparison of the amount of root galling on the roots of the test plants with that on tomato plants which are highly susceptible to all five species. Water-melons were not attacked by *M. hapla*. Peanuts were resistant to *M. incognita*, *M. incognita* var. *acrita* and *M. javanica* but were readily susceptible to *M. hapla* and *M. arenaria*. Pepper seedlings were lightly attacked by *M. javanica* and very susceptible to the other four species. R.T.L.

(30l) In comparative studies with seedlings of *Antirrhinum majus* and *Lycopersicon esculentum* inoculated with *Meloidogyne arenaria*, *M. hapla*, *M. incognita*, *M. incognita* var. *acrita* and *M. javanica*, the time required by these different species to attain various stages of development in the same host showed no significant differences but differed markedly with the hosts used. R.T.L.

(30m) When species of *Helminthosporium*, *Fusarium*, or other fungi grew on the rice substrate in a culture of the rice white tip nematode, *Aphelenchoides oryzae*, large numbers of the nematodes were present after a few weeks, whereas in the absence of fungi the nematodes failed to develop. R.T.L.

(30n) Experiments demonstrated that *Tylenchulus semi-penetrans* would complete its life-cycle on olive roots whether taken from olive or orange trees. Although no host specificity was apparent the orange appeared to be the more favourable host plant. It is pointed out that in any programme for the control of *T. semi-penetrans* the fact that olive trees can act as host should be remembered. R.T.L.

(30o) The viability of cysts of *Heterodera rostochiensis* was not much affected by storage for six months at temperatures ranging from 3°C. to 37°C. There was a high percentage of survival after exposure for eight months to Florida soil temperatures which varied from 21°C. to 30°C., with an average of 26°C., but this was significantly lower than the survival at New York soil temperatures which varied from 1°C. to 23°C., with an average of 9°C. R.T.L.

(30p) In the south-east of the U.S.A. symptoms of decline in the Chinese waterchestnut, *Eleocharis dulcis*, were due to infection of the roots by *Dolichodorus heterocephalus*. R.T.L.

† Abstract of paper presented at the 43rd Annual Meeting of the American Phytopathological Society, Cincinnati, December 10-12, 1951.

**30—Phytopathology (cont.)**

- q. TARJAN, A. C., LOWNSBERY, Jr., B. F. & HAWLEY, W. O., 1952.—“Pathogenicity of some plant-parasitic nematodes from Florida soils. I. The effect of *Dolichodorus heterocephalus* Cobb on celery.” 42 (3), 131-132.

(30q) *Dolichodorus heterocephalus*, originally considered to be an aquatic free-living species, is frequently found around the roots of crop plants in Florida. Experiments on celery seedlings have now shown that it may cause stunting and chlorosis, with a reduction in the number of fine feeder roots and the production of stubby secondary roots. When plants received 1,000 nematodes the root systems were reduced so severely that they could not support so many eelworms and many of these perished. R.T.L.

**31—Plant Disease Reporter.**

- a. RASKI, D. J., 1952.—“On the host range of the sugar-beet nematode in California.” 36 (1), 5-7.  
b. GILL, D. L., 1952.—“Effect of tung-nut meal and parathion on root-knot nematode infection.” 36 (1), 18-21.

(31a) The roots of carrots, cucumbers and *Crotalaria spectabilis* were invaded by the larvae of *Heterodera schachtii* when the plants were grown in the green-house in infested field soil collected near Salinas, California, but there was no further development. Golden Queen and Jubilee tomatoes, annual lupin, Golden Wax bush bean, Iron cow-pea, garden pea, sweet pea (*Lathyrus odoratus*) and purple vetch although not previously reported proved susceptible hosts. Cysts and females from the roots of the infected lupin, Golden Wax bush bean and Golden Queen tomato were not able to reinfect the original hosts but they succeeded in infecting sugar-beet. *Sesbania macrocarpa* was also readily attacked. *H. schachtii* females were also collected from the roots of *Amaranthus retroflexus*, *A. graecizans*, *Chenopodium murale* and *Solanum nigrum* but only rarely. R.T.L.

(31b) It has been claimed by nurserymen that tung-nut meal, much used as a fertilizer in the southern states of the U.S.A., controls the root-knot nematode (*Meloidogyne* spp.) Tests now show that it is of no value. Parathion when thoroughly mixed with the soil in pot culture was effective, but its practical use in the field is questionable. As it is absorbed through the skin and is toxic to human beings, it must be used with great care. R.T.L.

**32—Poultry Science.**

- a. KOUTZ, F. R., 1952.—“The effect of built-up litter on the parasite ova and oocysts of poultry.” 31 (1), 123-126.

(32a) Improved sanitation and nutrition are among the advantages which have been claimed for built-up litter for the continued rearing of successive groups of young chickens on the same unchanged litter. Its action is said to destroy harmful bacteria, protozoa and other disease-producing factors. Experiments showed, however, that all birds on built-up litter became heavily infected with *Ascaridia lineata*, *Heterakis gallinae* and *Capillaria retusa* whereas the controls remained free from infection. R.T.L.

**33—Revista Ibérica de Parasitología.**

- a. LÓPEZ-NEYRA, C. R., 1952.—“Análisis crítico de los géneros *Choanotaenia*, *Anomotaenia* y afines con redescubrimiento de la *Taenia porosa* Rudolphi 1810 e invalidez del género *Parictotaenia* Fuhreman, 1932. (Segunda parte y final.)” 12 (1), 1-58. [English summary pp. 52-56.]  
b. JORDANO, D., 1952.—“*Hymenolepis cordobensis* n.sp. (Cestoda Hymenolepididae), nueva tenia parásita de la paloma doméstica.” 12 (1), 59-64. [English summary p. 61.]  
c. GÁLLEGO BERENGUER, J., 1952.—“Un caso de teratología en trematodos. Atrofia unilateral total de la glándula vitelógena en *Fasciola hepatica*.” 12 (1), 65-67.

(33a) In this the second half of his critical discussion of the systematics of the Dipylidiinae López-Neyra gives emended definitions of *Amoebotaenia*, *Anomotaenia*, *Choanotaenia*, *Kowalewskiella* and *Liga*. He considers that many of the specific names of



earlier writers must fall as synonyms. *C. cayennensis* is renamed *C. joyeuxibaeri* n.sp., and *Arcterotaenia tringae* Burt, 1940 nec Joyeux, Baer & Martin, 1937 is renamed *C. burti* nom.nov. The various species are also catalogued under their avian hosts. [The first part of this work appeared in *Rev. ibér. Parasit.*, 11, 337-368. For abstract see *Helm. Abs.*, 20, No. 552a.] R.T.L.

(33b) *Hymenolepis cordobensis* n.sp. is described from a domestic pigeon in Córdoba. The description is accompanied by two plates with twelve figures. It is stated that the characteristic features are given in a table [which has apparently been omitted by the printer]. R.T.L.

(33c) Gállego Berenguer describes an abnormal *Fasciola hepatica* in which the vitellaria on one side were completely atrophied except for a small portion near the vitelline duct and Mehlis' gland. The other genitalia appeared to be normal and the uterus was packed with eggs. S.W.

#### 4—Rivista di Parassitologia.

- a. CHRISTOPHERS, S. R., 1952.—"The recorded parasites of mosquitoes." 13 (1), 21-28. [Italian summary p. 26.]
- b. PINOTTI, M., 1952.—"Considerazioni sulle attività del Servizio Nazionale di Malaria (Brasile)." 13 (1), 69-76. [English summary p. 76.]
- c. RICCI, M., 1952.—"Ricerche parassitologiche nell'Isola d'Ischia. I. Ricerche con lo 'Scotch cellophane tape' (metodo di Graham) sulla popolazione infantile." 13 (1), 83-88. [English summary p. 88.]

(34a) Among the recorded parasites of mosquitoes listed by Christophers are *Agamodistomum*, *Aganomermis* and *Mermis*. R.T.L.

(34b) In Belem, capital of the State of Pará, 10% of the population of about 200,000 have microfilariae of *Wuchereria bancrofti* in the peripheral blood. The infection rates in the chief vectors are *Culex fatigans* 11.6%, *Anopheles darlingi* 0.6% and *A. tarsimaculatus (aquasalis)* 0.5%. In 1952 a campaign with insecticides is being undertaken against *C. fatigans*. R.T.L.

(34c) The incidence of *Enterobius vermicularis* in six towns on Ischia Island as determined by a single examination of 721 children by Graham's Scotch tape technique was 30.65%. Ova of *Ascaris lumbricoides* and *Trichuris trichiura* were also frequently noted. R.T.L.

#### 5—Science.

- a. CHU, G. W. T. C., 1952.—"First report of the presence of a dermatitis-producing marine larval schistosome in Hawaii." 115 (2980), 151-153.

(35a) Cercariae tentatively identified as *C. littorinalinae* Penner, 1950, were found in 0% of 40 *Liitorina pintado* collected from Moku Manu ("Bird Island") near Kaneohe, Oahu, Hawaii, and in 0.5% of the same marine snail on Manana ("Rabbit Island") off shore from Oahu. That this cercaria can produce dermatitis in man was demonstrated experimentally on volunteers. R.T.L.

#### 6—South African Medical Journal.

- a. WALKER, A. R. P., ARVIDSSON, U. B. & DRAPER, W. L., 1952.—"Parasites in stools of peri-urban Bantu living around Johannesburg. A note on the incidence." [Correspondence.] 26 (2), 40.
- b. ELSDON-DEW, R., 1952.—"Collecting *Enterobius* ova." [Correspondence.] 26 (4), 79.
- c. ANON., 1952.—"A 'new' anthelmintic?" [Correspondence.] 26 (10), 198.

(36a) The incidence of helminth infections in 158 Bantu living within 10-20 miles of Johannesburg was, as found from faecal examinations, *Ascaris lumbricoides* 21.5%, *Taenia* sp. 3.3% and *Trichuris trichiura* 1.3%. Neither *Ancylostoma* nor *Schistosoma mansoni* was found. S.W.

(36b) Elsdon-Dew finds that the use of a small drop of benzol facilitates spreading the Scotch tape on the slide in the diagnosis of enterobiasis. S.W.

(36c) The author draws readers' attention to the claim that  $\beta$ -phenyl- $\beta$ -carboxy-(3,5-diiodo-4-hydroxy phenyl) ethane is a new anthelmintic and points out that this compound appears to be the same as the preparation "Pheniodol" ( $\beta$ -(4-hydroxy 2:5-di-iodo-phenyl)- $\alpha$ -phenylpropionic acid). [See also Helm. Abs., 20, No. 574c.] S.W.

### 37—Transactions of the American Microscopical Society.

- a. KAGAN, I. G., 1952.—"Further contributions to the life history of *Neoleucochloridium problematicum* (Magath, 1920) new comb. (Trematoda: Brachylaemidae)." 71 (1), 20-44.
- b. KUNTZ, R. E., 1952.—"Embryonic development of the excretory system in a pleurolophocercous (acanthostomatid) cercaria, three stylet cercariae (a microcercous cercaria, a brevicaudate, and a longicaudate dicrocoeliid cercaria) and in a microcaudate eucotyliid cercaria." 71 (1), 45-81.

(37a) Kagan, having already described the cercaria, metacercaria and adult [see *Trans. Amer. micr. Soc.*, 70, 281-318], now deals with the egg, miracidium and sporocyst of *Neoleucochloridium problematicum* and with the ecology of its vector, *Oxyloma retusa*. The egg contains a viable miracidium which hatches when eaten by the intermediate host. The sporocysts in the digestive gland are branched but there is no evidence that they cause castration. It is suggested that the function of the pigment in the sporocysts and rediae of trematodes may be other than sensory in nature. The evolutionary changes from a three host life-cycle to a two host cycle and the concomitant modifications are discussed. R.T.L.

(37b) The early development of the excretory system of the cercaria in digenetic trematodes is apparently similar and follows a fundamental or primitive plan. As this increases in complexity and extent it assumes the characteristics of the family to which the cercaria belongs. The excretory bladder in digenetic trematodes varies from a primitive, thin-walled type to an advanced, thick-walled and more efficient type. That of the fork-tailed cercariae represents the most primitive type. The comparative morphology of the excretory system of cercariae from ten families of trematodes suggests that it may provide an important basis for classification, and that a study of its phylogenetic development may be an additional criterion in determining relationships between groups of digenetic trematodes. R.T.L.

### 38—Transactions of the Royal Society of Tropical Medicine and Hygiene.

- a. BUCKLEY, J. J. C., 1952.—"A bush-clearing experiment to control *Simulium neavei*." [Demonstration.] 46 (1), 4.
- b. BERTRAM, D. S. & FREER, P., 1952.—"Environmental conditions during the infective meal as a factor affecting the intensity of infection of *Bdellonyssus bacoti* with the infective form of the filarial parasite of the cotton-rat." [Demonstration.] 46 (1), 4-5.
- c. FREER, P., 1952.—"Sections of the mite *Bdellonyssus bacoti* showing stages in the development of the microfilariae of *Litomosoides carinii*, the filarial parasite of the cotton-rat." [Demonstration.] 46 (1), 5.
- d. GORDON, R. M. & GRIFFITHS, R. B., 1952.—"Observations on the means by which the cercariae of *Schistosoma mansoni* penetrate mammalian skin; together with an account of certain morphological changes observed in the newly penetrated larvae." [Demonstration.] 46 (1), 8-9.
- e. MURGATROYD, F. & LAWRENCE, D., 1952.—"Guinea worm disease." [Demonstration.] 46 (1), 9.
- f. SMILES, J. & McFADZEAN, J., 1952.—"The embryological development of microfilaria (*Litomosoides carinii*) as shown by phase-contrast microscopy." [Demonstration.] 46 (1), 10.
- g. STANDEN, O. D., 1952.—"Preparation of a food material for the culture of fresh-water snails." [Demonstration.] 46 (1), 10.
- h. BIOCCA, E. & LEROUX, P. L., 1952.—"The molluscan host of *Schistosoma bovis* and other trematodes in Sardinia." [Demonstration.] 46 (1), 12.
- i. CARTA, A., 1952.—"Pathological lesions in the caecum and the pancreas in a case of schistosomiasis bovis in *Bos taurus* in Sardinia." [Demonstration.] 46 (1), 12.
- j. GIRGIS, B. & MAGID, A., 1952.—"Treatment of schistosomiasis." 46 (1), 81-84.
- k. BERGHE, L. VAN DEN & CHARDOME, M., 1952.—"The geographical distribution of *Acanthocheilonema streptocerca* in the Belgian Congo." 46 (1), 99-102.



- l. HUNTER, III, G. W., RITCHIE, L. S., TANABE, H., NAGANO, K., PAN, C. & YOKOGAWA, M., 1952.—"Studies on schistosomiasis V. Testing protective ointments against schistosomiasis by using schistosome dermatitis producing cercariae." 46 (2), 201-206.
- m. JORDAN, P., 1952.—"*Wuchereria bancrofti*." [Correspondence.] 46 (2), 207-208.
- (38a) *Simulium neavei*, the local vector of *Onchocerca volvulus*, has been practically eradicated from infested sections of the Riana River and its tributary the Yabe River in the South Kavirondo district of Kenya, by bush clearing and partial deforestation. R.T.L.
- (38b) Development to the infective stage of the filarial worm [*Litomosoides carinii*] by *Bdellonyssus bacoti* takes about 14 days. The mite gorges intermittently during 24 hours. When the surrounding temperature was 18°C. and the relative humidity 46% during the feeding of mites on three cotton-rats, infective forms appeared in 58%, 64% and 75% of the vectors. When the same cotton-rats were used with the temperature at 24°C. and the relative humidity 80%, the final infection rates in the mites were 70%, 90% and 98%. R.T.L.
- (38c) After a six-hour feed on a cotton-rat infected with *Litomosoides carinii* the microfilariae were distributed at random in the blood-filled gut of the mites. After a 24-hour feed some microfilariae were found in undifferentiated tissue outside the gut. Six days after feeding much bigger forms were present in the haemocoel. After a further seven days these had become pre-infective and infective forms. R.T.L.
- (38d) [A full account of this demonstration appears in *Ann. trop. Med. Parasit.*, 45, 27-243. For abstract see *Helm. Abs.*, 20, No. 340a.]
- (38e) Guinea-worms came to the surface on the buttock, scrotum and both thighs of an Indian patient and one was extracted from the base of the big toe. R.T.L.
- (38g) An insoluble gel which is a suitable food for newly hatched *Australorbis glabratus*, vector of *Schistosoma mansoni*, can be prepared from a solution of sodium alginate containing nutritive substances, poured in a very thin layer, then calcified by adding a solution of calcium chloride. The gel is preferred to lettuce by adult snails. R.T.L.
- (38h) *Bulinus truncatus* collected in a river bed at Santo Teodoro on the east coast of Sardinia were infected with cercariae of (a) *Schistosoma bovis*, (b) a paramphistome and (c) at least two echinostomids. The cercariae were freely discharged at 26°C. to 30°C. but not at 18°C. Domestic ducks and white rats when fed with echinostomid metacercariae from *B. truncatus*, *Limnaea limosa* and *Physa* sp. became infected with different species. Those in the white rats could easily be mistaken for *Echinostoma revolutum* which some workers claim to have recovered from man and from experimentally infected rats. These claims should be re-examined. In Sardinia *B. truncatus* is easily mistaken for *Physa* which inhabit the same pools. R.T.L.
- (38i) In a *Bos taurus* in Sardinia spindle-shaped eggs of *Schistosoma bovis* occurred in pseudotubercles in the mucosa propria of the caecum and adults were found in the submucosal veins. Intralobular pseudotubercles and several *S. bovis* were present in the interlobular veins of the pancreas. R.T.L.
- (38j) Although several drugs for the treatment of schistosomiasis have been introduced in recent years sodium and potassium antimony tartrate are still the most effective compounds in common use. Girgis & Magid treated with sodium antimony tartrate 40 males with urinary infections to ascertain the optimal dose and duration of treatment. In 28 cases in which a total dose of 15 mg. per kg. body-weight was given over a period of six successive days, the rate of cure was 67.8%. Three of these cases which had relapsed after previous treatment with tartar emetic and were still passing dead eggs in the urine were cured. The 15 mg. dosage gave almost the same result as the 12 mg. dosage used by Girgis & Aziz in nine cases. Relapses cannot be avoided so long as safe therapeutic doses are administered. If the injections are given on alternate days and the patient is kept at full rest in bed, tartar emetic treatment is not contra-indicated in chronic rheumatic and syphilitic heart disease, emphysema and chronic bronchitis. R.T.L.



(38k) Earlier records of the occurrence of microfilariae of *Acanthocheilonema streptocerca* in the dermis of adults in the Belgian Congo are supplemented by new information and the geographical distribution, expressed in percentage incidence, is set out on a map. The incidence is highest in the central area, reaching 100% south and east of Coquilhatville and the middle part of the Congo. No cases were discovered in the upper Katanga around Elisabethville in the region along Lake Tanganyika. The authors consider that the wide range of *A. streptocerca* complicates the problem of Congolese elephantiasis and suggest that *A. streptocerca* may be a more important factor in filariasis pathology that has hitherto been recognized. R.T.

(38l) The efficacy of six ointments to protect workers in Japanese paddy fields against dermatitis called "koganbyo" or lakeside disease, caused by an avian schistosome, was tested on 130 persons who, from repeated exposure, had acquired a marked sensitivity. During a 8-hour test period of work in rice paddy fields, the protection given by copper oleate was 95.5%, by dibutyl and dimethyl phthalate about 70%, by N-II between 64% and 70%, while N-I and benzyl benzoate were much less effective. The copper oleate ointment tended to stain clothing and was difficult to remove from the skin. One pound was sufficient to treat the arms up to the elbows and the legs below the knees of 30 to 40 people. The price quoted is \$1.00 in 25 lb. lots, F.O.B. New York. R.T.

(38m) Two cases of microfilariae in children approximately three and six months old are reported from Tanganyika. The earliest infection previously reported occurred in Guinea in a child fourteen months old. R.T.

### 39—University of California Publications in Zoology.

- a. VOGEL, M., 1952.—"Variation in some unarmed Hymenolepididae (Cestoda) from rodents." 57 (1), 1-52.

(39a) The characters on which the species *Hymenolepis diminuta*, *H. citelli* and *H. horrida* have been based are shown to be variable, notably in the position and number of testes. It is considered that the variability of the characters upon which the taxonomy of the unarmed hymenolepidids has hitherto been based should be investigated more closely. R.T.

### 40—Veterinary Medicine.

- a. TODD, A. C., 1952.—"Continuous phenothiazine therapy for horses. IV. The third year treatment." 47 (1), 25-26.  
 b. BURCH, G. R., 1952.—"Periodicity of microfilaria (*Dirofilaria immitis*)." 47 (1), 26.  
 c. COOPERRIDER, D. E., 1952.—"Check list of parasites of domestic animals reported in Georgia." 47 (2), 65-70.

(40a) Todd *et al.* have shown that horses given continuous low-level phenothiazine therapy for two years showed no harmful effects and that the number of strongyles had been significantly reduced [see Helm. Abs., 19, No. 422a]. Todd now reports that after a third year of continuous treatment, during which each of the four horses was given 2 gm. of phenothiazine daily in its grain ration, there was no haemolytic anaemia. The animals have remained in excellent condition, alert and without inappetence. The four-weekly worm egg counts of each horse are tabulated. R.T.

(40b) Burch gives microfilaria counts in samples taken at 4-hourly intervals from two dogs infected with *Dirofilaria immitis*, in support of his earlier claim that nocturnal sampling is unnecessary as the "filtesting" technique is extremely sensitive. Even when dogs were sampled at the periods of low microfilarial peripheral concentration the technique was 100% accurate in 48 tests. R.T.

(40c) The helminths known to occur in domesticated animals are tabulated in columns showing (i) group or common name, (ii) scientific name, (iii) location in host and (iv) intermediate hosts. R.T.



**41—Veterinary Record.**

- a. BUXTON, J. C., FORD, C. M. & MUNRO, I. B., 1952.—“Infestation of domestic ducks with *Acuaria (Echinuria) uncinata*.” 64 (1), 5–6.
- b. CRONIN, M. T. I. & LEADER, G. H., 1952.—“Coronary occlusion in a thoroughbred colt.” 64 (1), 8.
- c. MCGAUGHEY, C. A., 1952.—“Filariasis of dogs in Ceylon. Treatment with diethylcarbamazine.” 64 (5), 66–68.
- d. INNES, J. R. M., SHOHO, C. & PERUMAL PILLAI, C., 1952.—“Epizootic cerebro-spinal nematodiasis (or setariasis): so-called lumbar paralysis. A focal encephalomyelomalacia of animals in the Orient.” [Correspondence.] 64 (11), 169–170.

(41a) The occurrence of *Acuaria (Echinuria) uncinata* in domesticated ducks in Britain is reported for the first time. Out of 250 Aylesbury ducks transferred to a lake near the east coast, 50 died within eight days. The lake was infested with *Daphnia* and *Cyclops* but none of those examined were infected. The infection is attributed to the droppings of wild aquatic birds. Over 300 worms were recovered from swellings in the proventriculus of one bird. Apart from rapid emaciation and dullness, there were few symptoms in the acute cases but in the more chronic cases there was almost complete obstruction of the proventriculus and impaction of food.

R.T.L.

(41b) Sudden death from coronary occlusion in a colt during exercise was associated with endarteritis and thrombus formation in which numerous larval *Strongylus vulgaris* were embedded.

R.T.L.

(41c) Of 50 dogs examined in Ceylon, 16 with microfilariae in the blood showed clinical symptoms which included lassitude, anorexia, cough, emaciation, epistaxis, pruritus and intractable eczema but no marked rise of temperature. Adult *Dirofilaria repens* were found post mortem in two dogs. Nine of the dogs were given prolonged courses of Caricide (diethylcarbamazine) but clinical improvement and reduction of microfilariae were slow. In one case there was a violent allergic reaction and adult worms migrated through the skin to the exterior soon after treatment had commenced.

R.T.L.

(41d) Innes *et al.* consider that Bush's claims [see Helm. Abs., 20, No. 101b] regarding the nature of lumbar paralysis in sheep, goats and horses, must be regarded with scepticism. It is pointed out that he dismisses the excellent work of Japanese veterinarians which implicated *Setaria digitata* and is apparently not aware of studies on the disease in Ceylon.

R.T.L.

**42—World Crops.**

- a. HIGLEY, J. C., 1952.—“Shell D-D for eelworm control.” 4 (3), 103–104.

(42a) Higley gives an account of the methods of application of D-D mixture in greenhouses and small areas by hand operated injector gun and by machines from which the nematicide is fed by gravity. Treatment of plots infested with *Heterodera rostochiensis* in Ayrshire over a period of 3 years showed that the rate of 800 lb. per acre was not economical but that at lower concentrations of 200 lb. and 400 lb. per acre there was an increase in yield and a definite decrease in eelworm attack. The effects of a single treatment were still seen three years later. The increases in value of the additional crop are tabulated. Daffodil bulbs treated with one application of D-D resisted attack by *Pratylenchus pratensis*. First class flower crops with excellent growth of foliage and bulbs were obtained in the Scilly Isles for up to 3 years after a single application.

R.T.L.

**43—Zentralblatt für Bakteriologie. Abteilung 1. Originale.**

- a. BÜSING, K. H., 1952.—“*Pseudomonas hirudinis*, ein bakterieller Darmsymbiont des Blutegels (*Hirudo officinalis*).” 157 (7), 478–484. [English, French & Russian summaries p. 484.]
- b. JIROVEC, O., 1952.—“Studien über die Verbreitung und Chemotherapie der Oxyuriasis in der Tschechoslowakei.” 157 (7), 539–546.

(43b) Of a total of 5,513 children, examined in Bohemia and Moravia by the Schöffner anal swab technique, 3,276 (i.e. 59.4%) were positive for *Enterobius*. In Prague the number infected varied between 42% and 60%. The highest figures (73% to 87%) were obtained from schools in south Bohemia and the Bohemian Forest. It is estimated that in adults the infection rate lies between 25% and 30%. Preliminary reports on treatment with tablets each



containing 0.25 gm. phenothiazine, 0.05 gm. hexylresorcinol and 0.05 gm. basic fuchsin showed it to be successful and worthy of further trial. The dosage varied between one tablet morning and evening for two days (children aged two to three) and two tablets three times a day for seven to eight days (adults). Of 37 persons given this treatment 24 (77.6%) were completely cured.

A.E.F.

### NON-PERIODICAL LITERATURE

- 44—MINISTRY OF AGRICULTURE & FISHERIES, 1952.—“Scheme for the inspection of growing crops of potatoes, 1952. ‘A’ certificate. Explanatory memorandum: conditions.” London: Ministry of Agriculture & Fisheries, 4 pp.

To qualify in 1952 for the “A” Certificate of the Ministry of Agriculture of England and Wales, crops of potatoes must have been grown from stocks of 1951 certified stock seed or “A” Certificate seed in areas provisionally approved, viz., the north of England at altitudes of 400 ft. or over; the south-west of England, Wales, the county of Salop, the Forest of Dean and a small portion of Herefordshire at altitudes of 500 ft. or over; the Blackdown, Brendon, Mendip and Quantock Hills (Devon and Somerset) and the remainder of Herefordshire and in the Cotswolds at altitudes of 650 ft. or over, or in Anglesey, parts of the Welsh coast and of the north coast of Devon without restriction as to altitude. The crop must be grown on land which has not carried a potato crop in any of the previous three years and has been found to be free from potato root eelworm as a result of an official examination.

R.T.L.

- 45—MINISTRY OF AGRICULTURE & FISHERIES, 1952.—“Scheme for the inspection of growing crops of potatoes, 1952. Stock Seed. Explanatory memorandum: conditions.” London: Ministry of Agriculture & Fisheries, 4 pp.

For a “stock seed” certificate in 1952 the Ministry of Agriculture of England and Wales require that the potato crop has been grown from 1951 certified stock seed in approved areas provisionally defined as at altitudes of 400 ft. or over in the north of England, at altitudes of 500 ft. or over in the south-west of England and in small portions of the counties of Salop Hereford and Monmouth and in Wales except in Glamorgan, Monmouth and portions of Denbighshire, Flint and Montgomeryshire, and without altitude restrictions in Anglesey parts of the Welsh coast and parts of the north coast of Devon. The crop must be grown on land which has not carried a potato crop in any of the previous three years and on land found to be free from potato root eelworm as a result of an official examination. The crop must be grown at least 50 yards from any other potato crop.

R.T.L.

- 46—MINISTRY OF AGRICULTURE & FISHERIES, 1952.—“The Sugar Beet Eelworm Order, 1952.” London: H.M. Stationery Office, 5 pp.

Under the Sugar Beet Eelworm Order, 1952 made by the Minister of Agriculture and Fisheries for England and Wales, no person, except under licence, shall sow or plant, or cause or permit to be sown or planted, any seed or plant of the families Chenopodiaceae and Cruciferae, including sugar-beet, fodder beet, mangold, red beet, spinach, spinach beet, cabbage, kale, cauliflower, broccoli, brussels sprout, turnip, swede, rape or coleseed (including turnip rape and swede rape), mustard, cress, radish or kohlrabi, (i) on any land in which sugar-beet eelworm is known to exist; (ii) on any land situated within an infested area [defined in an accompanying schedule as those parts of the counties of Cambridge, Huntingdon, Isle of Ely, Norfolk and Suffolk West which lie within the boundaries specified in the schedule] on which any of the crops aforementioned have been grown during the preceding 24 months. “Sugar-beet eelworm” is defined as “*Heterodera schachtii* Schmidt restricted to the species or race that attacks plants of the families Chenopodiaceae and Cruciferae”. No person, except under licence, shall knowingly sell or offer for sale for planting, or plant or cause or permit to be planted elsewhere than on the farm or holding on which they were grown, any potatoes which have been grown on land in which sugar-beet eelworm is known to exist. The Order does not apply to any allotment garden or private garden, or to any crop which is growing or has been grown thereon except when it forms part of a field not entirely divided into allotment gardens.

R.T.L.